scores (and changes) using results of a mixed treatment comparison (first 6 months) and data from long-term extension trials (later treatment periods). Where available, meta-analysis data were used to estimate adverse events incidence, followed by individual trial data and registry estimates. Canadian data from published sources were used to derive healthcare resource utilization costs and EuroQol-5D scores from HAQ-DI scores. All costs were estimated in 2014 Canadian dollars. Probabilistic and one-way sensitivity analyses were completed on analytical horizon, event rates, and efficacy thresholds. **RESULTS:** After running the model for 100,000 simulations of moderate to severe RA patients, the treatment arm including tofacitinib had lifetime costs of $298,434 with 8.17 QALYs. Comparatively, the treatment arm excluding tofacitinib had a lifetime cost of $305,158 with 7.88 QALYs. Therefore, a treatment strategy including tofacitinib is dominant with lower costs and greater effectiveness. One-way and probabilistic sensitivity analysis reflected the robustness of these results. **CONCLUSIONS:** The inclusion of tofacitinib into the treatment strategy for moderate to severe RA is a dominant strategy in Canada (lower cost and increased QALYs).

PMS47

MODELLING THE COSTS AND OUTCOMES ASSOCIATED WITH SEQUENCE OF TREATMENT WITH AND WITHOUT TOFACITINIB FOR THE TREATMENT OF MODERATE TO SEVERE RHEUMATOID ARTHRITIS IN THE US

Claxton L[1], Taylor M[1], Moynagh D[2], Gruben D[3], Wallenstein G[3], Singh A[2]
[1]*York Health Economics Consortium, University of York, York, UK,* [2]*Pfizer Inc, Collegeville, PA, USA,* [3]*Pfizer Inc, Groton, CT, USA*

OBJECTIVES: Rheumatoid arthritis (RA) is a chronic inflammatory condition with significant economic burden. Tofacitinib is an oral Janus kinase inhibitor indicated in the US for the treatment of moderate to severe RA in patients with inadequate response to methotrexate. Given the similarity of indications across available therapies, economic evaluation of alternate treatment strategies could inform US formulary decisions. We estimated incremental cost-effectiveness ratios of tofacitinib after methotrexate failure in a treatment sequence compared with a similar sequence without tofacitinib from a US third-party payer's perspective. **METHODS:** The model estimated costs and outcomes of RA treatment with a pre-specified "treatment sequence" (sequential methotrexate, tofacitinib, adalimumab, abatacept, tocilizumab, rituximab) versus a "comparator sequence" (sequential methotrexate, etanercept, adalimumab, abatacept, tocilizumab, rituximab). Alternative sequences were considered. Efficacy was assessed by Health Assessment Questionnaire (HAQ) and compared using mixed treatment comparison and data from long-term extension trials. Adverse event data were from published meta-analyses and trials of tofacitinib and comparators. Patient characteristics were based on tofacitinib clinical trials (NCT00856544; NCT00847613; NCT00853385). RA-related costs were from published data mapping HAQ onto healthcare resource utilization in US patients with RA. Indirect costs were not considered. **RESULTS:** From a US third-party payer's perspective, the predicted lifetime cost of "treatment sequence" including tofacitinib was $509,047 versus $546,860 for "comparator sequence" without tofacitinib, with the difference primarily driven by drug cost. The "treatment sequence" with tofacitinib resulted in an additional 0.11 quality-adjusted life years versus "comparator sequence." Probabilistic sensitivity analysis suggested the probability that tofacitinib is cost-effective as second-line therapy is 64.0% at a threshold of $100,000. **CONCLUSIONS:** Our model suggests that including tofacitinib as second-line therapy following methotrexate failure is a cost-effective alternative versus a "comparator sequence" without tofacitinib. Sensitivity analysis reiterated robustness of the findings and cost-effectiveness of including tofacitinib. Results of alternate treatment sequence comparisons were similar.

PMS48

COST-EFFECTIVENESS OF TOCILIZUMAB FOR THE MANAGEMENT OF INADEQUATELY RESPONDING RHEUMATOID ARTHRITIS PATIENTS

Hansen RN[1], Best JH[2], Sullivan SD[3], Carlson JJ[3]
[1]*School of Pharmacy, University of Washington, Seattle, WA, USA,* [2]*Genentech, Inc, South San Francisco, CA, USA,* [3]*University of Washington, Seattle, WA, USA*

OBJECTIVES: Rheumatoid arthritis (RA) is a chronic inflammatory disorder of the musculoskeletal system. After inadequate response (IR) to anti-tumor necrosis factor (anti-TNF) treatments, the clinical and economic value of alternative biologic agents is unclear. We sought to estimate the cost-effectiveness of tocilizumab versus abatacept from a U.S. payer perspective. **METHODS:** We constructed a treatment-regimen based cohort model with a lifetime horizon. The model evaluated the treatment comparison of tocilizumab (162mg every other week with escalation to weekly for inadequate responders) vs. abatacept (125mg, weekly). In this comparison, treatment initiation was followed by a certolizumab-tofacitinib-rituximab-palliative care sequence. Treatment response rates were applied every 6 months. Health related quality of life was mapped to the health assessment questionnaire (HAQ) for RA. Mortality was modelled allowing for both non-RA and RA-specific mortality predicted by the HAQ. Costs were derived from published sources and included drug treatment, monitoring, and direct medical resource utilization. Costs and QALYs were discounted at 3%. Sensitivity analyses were performed to test the robustness of the model results. **RESULTS:** Comparing the two initial treatments, tocilizumab dominated abatacept yielding better outcomes and fewer costs. Probabilistic sensitivity analyses indicated substantial uncertainty, yet the mean estimates remained consistent with the deterministic results. Tociluzumab had an 89% probability of being cost-effective at $50,000/QALY. The one-way sensitivity analysis indicated that the parameters related to baseline HAQ and improvement in the ACR 50 and 70 rates had the most impact on model results. **CONCLUSIONS:** Management of TNF-IR patients with RA represents a challenge for the health care system. Compared to abatacept, tocilizumab appears to represent a lower cost treatment option with improved outcomes. However, with the attendant uncertainty, head-to-head trials of these agents may be warranted.

PMS49

COST-EFFECTIVENESS ANALYSIS OF CONDOLIASE IN PATIENTS WITH LUMBAR DISC HERNIATION IN JAPAN

Ikeda S[1], Inoue S[1], Kobayashi M[2]
[1]*International University of Health and Welfare, Otawara City, Tochigi, Japan,* [2]*CRECON Medical Assessment Inc., Tokyo, Japan*

OBJECTIVES: Condoliase, an enzyme that specifically degrades glycosaminoglycans, main constituents of the nucleus pulposus, and reduces the compressions on nerves, can serve as a less-invasive curative treatment for patients with lumbar disc herniation and is expected to reduce associated medical cost due to shortened hospital stays. This study aims to evaluate the cost-effectiveness of the treatment with condoliase compared with conventional surgical therapy in the Japanese healthcare system. **METHODS:** A Markov model was developed to estimate quality-adjusted life year (QALY) and associated costs over 1 year. QOL scores were converted from corresponding Oswestry Disability Index (ODI). ODI of condoliase group came from the results of a phase 3, multicenter, double-blind, randomized placebo-controlled study conducted in Japan. ODI of surgery group was estimated from the values obtained from published literatures. The risk of re-operation after treatment was considered during calculation. Surgical treatment costs and re-operation costs were collected and estimated using a Japanese administrative claims database (Japan Medical Data Center, JMDC). Payer perspective was adopted, and discounting was not applied due to the short timeframe of the analysis. One-way sensitivity analysis was performed to assess the impact of parameter uncertainty on the model's conclusion. **RESULTS:** Average cost and effectiveness gained per patient for condoliase group and surgery group were 385,344 JPY vs. 798,919 JPY, 0.694 QALY vs. 0.685 QALY, respectively, meaning condoliase group was dominant compared to surgery group. One-way sensitivity analysis showed the robustness of this result. **CONCLUSIONS:** From the payer perspective, treatment with condoliase for patients with lumbar disc herniation in Japan is expected to reduce medical costs compared to conventional surgery treatment even taking into account the uncertainties.

PMS50

ECONOMIC EVALUATION OF TOFACITINIB AS INITIAL MEDICATION IN ADULTS WITH RHEUMATOID ARTHRITIS AFTER FAILURE TO METHOTREXATE IN CHILE

Velasquez ZM[1], Bustos Medina L[1], De la Puente AC[1], Zaror SC[1], Gutierrez-Ardila MV[2]
[1]*Universidad de La Frontera, Temuco, Chile,* [2]*Pfizer Chile S.A., Santiago, Chile*

OBJECTIVES: Rheumatoid Arthritis (RA) destroys synovial joints and generates pain. Its prevalence in Chile has been estimated to be 0.46% (IC 95% 0.24-0.8). Available drugs for treatment include conventional synthetic Disease-Modifying Antirheumatic Drugs (csDMARDs), biological therapies and a new drug approved for treatment after failure of csDMARDs: tofacitinib. The aim of this study is to compare the costs-effectiveness of tofacitinib relative to biological therapies as an initial treatment in adults with RA after failure of methotrexate in Chile. **METHODS:** A simulation model of individual patients compared two treatment sequences for RA: tofacitinib vs biological therapy as initial medications; always assuming a combination therapy with methotrexate; biological therapies validated with rheumatologists and included in the model were etanercept, infliximab, tocilizumab, adalimumab, rituximab and salvage therapy (defined by experts). The characteristics of the patient included: age, weight, initial HAQ score, and clinical response to short and long term treatment. HAQ scores were used to calculate utilities, measured in QALYs based on literature information. All costs were obtained from public tenders and official reports from Chilean Ministry of Health. The analysis was made from third payer perspective with one, five, ten years and lifetime horizon. Annual discount rate was 3% for costs and outcomes. Results are expressed in USD2014 (US$1 = CLP$600) **RESULTS:** Total costs, for year one of treatment was US$9,627 starting the sequence with tofacitinib and US$11,638 starting with etanercept; obtained HAQ-QALYs were 0.76 and 0.68, respectively. The total cost of the sequence strategy for lifetime horizon initiating with tofacitinib, was US$236,373 compared to the treatment with biological therapy: US$259,403 with a difference of 0.62HAQ-QALY for utility. The costs included the drug, administration and health care. **CONCLUSIONS:** The sequence of treatment initiating with tofacitinib for RA Arthritis is a dominant strategy compared to biological therapies used in Chile. Net savings with this drug is US$35,006

PMS51

WHAT IS THE COST-EFFECTIVE BEARING SURFACE CHOICE IN PRIMARY TOTAL HIP ARTHROPLASTY

Carnes KJ[1], Odum SM[2], Troyer JL[1], Fehring TK[3]
[1]*University of North Carolina at Charlotte, Charlotte, NC, USA,* [2]*OrthoCarolina Research Institute, Inc., Charlotte, NC, USA,* [3]*OrthoCarolina Hip and Knee Center, Charlotte, NC, USA*

OBJECTIVES: Primary Total Hip Arthroplasty(THA) provides quality of life to patients and is cost-effective. Improvements to implant life have focused on the bearing surface with ceramic-on-polyethylene (CoP) bearing use growing rapidly due to evidence of longer implant life. We sought to determine if the increased CoP cost over the metal-on-polyethylene (MoP) provides enough benefit through lower revision rate to justify its utilization. **METHODS:** A Markov decision model was designed to determine the reduction in CoP 20-year revision rate required to make this implant cost-effective compared to MoP. Premier's 2012 Research Database provided hospitalization costs for primary and revision surgeries. The Orthopedic Research Network (ORN) provided aggregated implant purchase price information. The HealthEast Joint Registry was the source of the MoP revision rate used for comparison. At each 10-year age increment/bearing cost condition, the CoP revision rate was varied until the lifetime costs were equal for the 2 different bearings. **RESULTS:** The sample included 20,398 patients aged 45-89+ from 475 US hospitals with identified bearing surfaces. CoP vs. MoP surface cost differences were $325+/-$177(p=0.014) and $1,003+/-$710(p=0.003), respectively, based on unadjusted and adjusted analysis of Premier data. ORN reports indicated a $600 difference in 2012. Revision costs were $23,628+/-$385 on 8,566 patients. HealthEast's data indicates a 20-year MoP revision rate of 14.5/100THAs. An inflection in the revision

rate-cost-age curve at 70yo prompted further consideration. Markov analysis indicated the cost-effective CoP revision rate to be 12.5 revisions/100THAs at $325 cost difference and 9.0/100THAs at $1,003 cost difference, in a 70yo patient, indicating that CoP can be cost-effective. **CONCLUSIONS:** Shifting from MoP to CoP can be justified depending on the patient age, cost of the device, and actual CoP revision rate. All else equal, shifting all THAs in patients below age 70 to CoP and over 70 to MoP can be cost justified, even in the highest cost difference case.

PMS52

COST-EFFECTIVENESS ANALYSIS OF CERTOLIZUMAB, ETANERCEPT, GOLIMUMAB AND TOFACITINIB FOR THE TREATMENT OF MODERATELY TO SEVERELY ACTIVE RHEUMATOID ARTHRITIS

Han X, Hay JW
University of Southern California, Los Angeles, CA, USA

OBJECTIVES: Etanercept (ETA), certolizumab (CZP) and golimumab (GLM), each in combination with methotrexate (MTX) are the currently indicated treatment regimen for moderate to severe rheumatoid arthritis (RA). Recently, a novel oral agent, tofacitinib (CP-690550), was approved to treat RA. This study assesses the relative costs and effectiveness of these four disease modifying antirheumatic drugs (DMARDs) from a societal perspective. **METHODS:** We developed a Markov model that tracked a cohort of patients through the four disease states of RA progression, defined based on the patients' disease activity score (DAS28). We estimated each drug's effectiveness from published head-to-head clinical trial data. We derived quality of life utility scores and costs data for each disease state from the published literature. For each agent, we estimated the discounted costs, quality-adjusted life years (QALYs) and incremental cost-effectiveness ratios (ICERs). Univariate sensitivity analyses were conducted to assess the impact of parameter uncertainty on our results. **RESULTS:** Relative to other drugs, and at the average US societal willingness to pay (WTP) threshold of $150,000/QALY gained, ETA+MTX was the most cost-effective treatment regimen, with an ICER of $US 15,670/QALY gained when compared with CZP+MTX. The novel oral agent, CP-690550, was also relatively cost-effective, with an ICER of $US 31,643/QALY gained relative to CZP+MTX. GLM+MTX was not deemed cost-effective ($239,000/QALY gained) relative to all other regimens, at the conventional US WTP threshold. Sensitivity analyses showed that results were very sensitive to the costs of each treatment. **CONCLUSIONS:** ETA+MTX is the most cost-effective treatment for moderate to severe RA in US patients. Compared to CZP+MTX, the novel oral agent, CP-690550, is also highly cost-effective. GLM+MTX is not cost-effective.

PMS53

ECONOMIC EVALUATION OF TREATMENT SEQUENCES FOR THE MANAGEMENT OF PATIENTS WITH RHEUMATOID ARTHRITIS IN THE ECUATORIAN PUBLIC HEALTHCARE SECTOR

Rosado-Buzzo A[1], Luna-Casas G[2], Garcia-Molliendo L[2], Albuja M[3]
[1]*Linkd and Links, Mexico City, Mexico,* [2]*Links and Links, Mexico City, Mexico,* [3]*Pfizer Ecuador, Quito, Mexico*

OBJECTIVES: To compare health outcomes and costs associated with a treatment sequence that includes tofacitinib with another treatment sequence without tofacitinib in patients with Rheumatoid Arthritis (RA) who failed to DMARDS from the payer's perspective of the Ministry of public healthcare in Ecuador. **METHODS:** We compared with an Excel-based patient level simulation model, in a lifetime horizon, two treatment sequences, 1) treatment sequence: includes the use of tofacitinib, etanercept, adalimumab, tocilizumab, rituximab and salvage therapy, 2) comparator sequence: includes the use of adalimumab, etanercept, inflximab, tocilizumab, rituximab and salvage therapy. All patients modeled received concomitant treatment with methotrexate. Based on the available randomized controlled trials, HAQ score and clinical response to short and long term treatment data were obtained to calculate utilities, which were measured in QALYs. All costs information 2014 (drug and adverse events) were obtained from public data sources of the Ministry of Public Healthcare in Ecuador. **RESULTS:** Total costs in the lifetime horizon of treatment were $199,707.58 USD for the treatment sequence and $213,956.21 USD in the comparator sequence. Incremental costs for drug costs, administration costs, healthcare resources costs and other costs in the treatment sequence were -$11,881.02 USD, -$213.48 USD, -$460.56 USD and -1,694.60 USD respectively compared with the comparator sequence. Also the treatment sequence showed an incremental QALYs gain of 0.26 compared with the comparator sequence. **CONCLUSIONS:** Results suggest that the sequence treatment that includes the use of tofacitinib, represent a cost-saving alternative when compared to the comparator sequence, in patients with Rheumatoid Arthritis (RA) who failed to DMARDS. This may represent savings for the Ministry of Public Healthcare in Ecuador.

PMS54

COST EFFECTIVENESS OF TOFACITINIB AS SECOND LINE TREATMENT VS USING BIOLOGICAL THERAPIES IN THE TREATMENT OF MODERATE RHEUMATOID ARTHRITIS AFTER FAILURE OF DMARDS IN PANAMA IN 2014

Garita-Aguilar M[1], Peralta-Acon M[1], Gorriz-Añorbes L[2]
[1]*Pfizer Central America and Caribbean, San José, Costa Rica,* [2]*Ministerio de Salud de Panamá, Ciudad de Panamá, Panama*

BACKGROUND: Rheumatoid Arthritis (RA) affects approximately 0.4% of the Latin American population over 16 years old. [1]. Many patients with rheumatoid arthritis (RA) do not respond adequately with disease-modifying antirheumatic drugs (DMARDs), being eligible for biological treatment available. **OBJECTIVES:** The objective was to evaluate the cost-effectiveness of Tofacitinib as second line vs continue using biological therapies in moderate RA after failure of DMARDs in Panama's Ministry of Health (MINSA) in 2014. **METHODS:** The cost-effectiveness model uses a patient-level simulation approach and assesses the economic and health benefits for the management of patients with RA who have an inadequate response to methotrexate. The model compares a treatment sequence with Tofacitinib followed by biologic treatments vs a sequence of biological treatments only, in the patient care pathway. The sequence of biologics treatments used in both cases is: Infliximab, Adalimumab, Tocilizumab, Rituximab, Etanercept and salvage therapy, according to experts opinion from MINSA [2]. All patients received concomitant treatment with methotrexate. The characteristics included in model are: age, weight, initial HAQ score, severe adverse events (SAE) and clinical response to short and long term treatment; randomized controlled trials were used as source information when local information was not available [3,4]. HAQ scores were used to calculate utilities, measured in QALYs [5,6,7]. Only direct costs were considerate from MINSA databases of 2014 [8]. A lifetime horizon time was used with an annual discount rate of 5%. **RESULTS:** Total cost and total QALY per patient in a lifetime period are $193,971 and 9.28 QALY for treatment sequence with Tofacitinib; $205,015 and 9.20 for treatment sequence with biologic therapy. The cost saving for treatment sequence with Tofacitinib in years one, five and ten were: 12%, 10%, 8% respectively. **CONCLUSIONS:** In case of MINSA, the sequence initiating with Tofacitinib is a cost-saving alternative compared with biologic therapy.

PMS55

ECONOMIC EVALUATION OF TIMELY VERSUS DELAYED USE OF ANTI-TUMOR NECROSIS FACTOR (TNF) BIOLOGICS IN THE TREATMENT OF PSORIATIC ARTHRITIS (PSA) IN THE US

Zhou Z[1], Signorovitch JE[2], Griffith JM[3], Zhong Y[1], Ganguli A[3]
[1]*Analysis Group Inc., Boston, MA, USA,* [2]*Analysis Group, Inc., Boston, MA, USA,* [3]*Abbvie Inc., North Chicago, IL, USA*

OBJECTIVES: Progression of PsA can lead to irreversible damage, functional impairment, and associated healthcare costs. Anti-TNF biologics have been shown to delay PsA progression and seem to have better efficacy compared with apremilast, a phosphodiesterase-4 inhibitor recently approved for PsA. The impact of using apremilast prior to anti-TNF has not been fully understood. This study evaluated the economic impacts of timely versus delayed use of anti-TNF among patients with moderately-to-severely active PsA from a US payer perspective. **METHODS:** A Markov model was developed to evaluate the costs and outcomes of two treatment sequences over a one-year time horizon. PsA patients received either adalimumab (timely use of anti-TNF) or apremilast (delayed use) as initial treatment. Those who did not achieve ACR20 response in the first 12 weeks of treatment or who lost ACR20 response would use subsequent treatments, which included a mixture of anti-TNF biologics, followed by palliative care. Efficacy was based on ACR20 response, changes in the Health Assessment Questionnaire (HAQ), and reduction in skin lesions measured by the Psoriasis Area and Severity Index (PASI). Direct costs, including treatment-related costs and other medical costs, and incremental costs per responder were calculated. Subgroup analyses among patients with moderate-to-severe psoriasis were performed. **RESULTS:** After one year, patients starting with adalimumab had higher ACR20 response rates and higher costs than apremilast (70.4% vs. 59.6%, $37,732 vs. $31,173). The one-year incremental cost per ACR20 responder was $60,766 for timely vs. delayed use of anti-TNF. Among the subgroup with psoriasis, starting with adalimumab lead to higher response rates in both ACR20 and PASI75 and higher costs compared with apremilast (43.2% vs. 30.0%, $39,329 vs. $33,143). The incremental cost per ACR20+PASI75 responder was $46,949. **CONCLUSIONS:** Timely use of anti-TNF is a cost-effective strategy for the management of PsA due to improvements in joint and skin condition.

PMS56

ECONOMIC ANALYSIS OF BIOLOGIC ALTERNATIVES IN THE MANAGEMENT OF RHEUMATOID ARTHRITIS, PSORIASIS AND ANKYLOSING SPONDYLITIS FROM PUBLIC AND PRIVATE PERSPECTIVES IN BRAZIL

Ferreira CN[1], Rufino CS[1], Amaral LM[2], Fernandes RA[2]
[1]*Pfizer Brasil, São Paulo, Brazil,* [2]*MedInsight, Rio de Janeiro, Brazil*

OBJECTIVES: This study aims to perform a cost-effectiveness analysis of biologic alternatives for rheumatoid arthritis (RA), psoriasis (PSO) and ankylosing spondylitis (AS) in Brazil, from public and private perspectives. **METHODS:** A decision tree model was developed for AR and PSO to evaluate the cost-effectiveness of biological drugs (etanercept, adalimumab, infliximab, tocilizumab, abatacept and rituximab). Effectiveness measures were extracted from literature and outcomes included: ACR20 and ACR70 responses, and HQA for RA; and PASI 75 success rate for PSO. Only costs were compared for AS because the model assumed the same effectiveness for drugs, according to literature review. Direct medical costs included biological acquisition, adverse events management and infusion (if applicable), presented in 2014 BRL. **RESULTS:** From the public perspective, in AR, etanercept was the most cost-effective option when compared to others drugs for all measures (158,731 BRL for ACR20, 282,448 BRL for ACR70 and 121,946 BRL for HAQ), followed by adalimumab, infliximab and tocilizumab, and rituximab. The same result was observed for PSO. Etanercept showed a cost-effectiveness ratio per PASI 75 response of 104,820 BRL versus 110,886 BRL for adalimumab. From the private perspective, once again etanercept was the most cost-effective option for all evaluated diseases. In RA, the cost-effectiveness ratios per ACR20, ACR70 and HAQ were 193,211 BRL, 343,802 BRL, 148,435 BRL, respectively, and in PSO the value observed per PASI 75 response was 133,871 BRL versus 179,607 BRL for adalimumab and 268,504 BRL for infliximab. In AS, from both perspectives, etanercept represented the least costly option: 55,581 BRL versus 69,602 BRL for infliximab (public); 70,985 BRL versus 75,435 BRL for adalimumab and 99,883 BRL for infliximab (private). **CONCLUSIONS:** Etanercept showed the best cost-effectiveness ratio and lower costs when compared to others biological drugs in the management of AR, PSO and AS, from both Brazilian perspectives.

PMS57

COST-EFFECTIVENESS ANALYSIS OF BISPHOSPHONATES FOR SECONDARY PREVENTION OF HIP FRACTURE IN TAIWAN

Lo P[1], Wen Y[2], Tsai Y[1]
[1]*National Yang Ming University, Taipei, Taiwan,* [2]*Chang Gung University, Taoyuan, Taiwan*